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ABSTRACT

Certain characteristics of a Taylor (1965) competitive reaction time task contribute to a lack of awareness of contingencies that exist between two aggressors. The opponent's contingent response to the subject's specific shock setting may be obscured by the reaction time competition, thus concealing the matching contingency. Nine separate steps must occur between a subject and an opponent in order to communicate a matching contingency when using the competitive reaction time task. This is also true in the study of human aggression via-a-vis reaction time tasks using an adaptation of Hokanson, Willers, and Koropsak's (1968) interpersonal communication paradigm. Application to aggression of social learning theory suggests that persons who have a high expectation that their aggressive behavior will result in retaliation will be less aggressive than persons who do not expect retaliation. It was hypothesized that subjects who were likely to recognize the matching contingency more rapidly in the communication task would reduce their shock settings more rapidly during the communication task than during the reaction time task. Female college students (N=10) participated in a series of 25, 20-second trials and then completed a questionnaire to assess suspicion of their opponent and how they set their subsequent shock strategies. An analysis of variance for the last trial of the attack phase and the first three trials of the matching phase revealed the predicted interaction of task and trials, thereby supporting the hypothesis. (Author/HLM)

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A Comparison of Reaction Time and Interpersonal Communication Tasks for Testing the Effectiveness of a Matching Strategy in Reducing Attack Instigated Aggression [1,2]

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The Taylor (1965) reaction time procedures have been in frequent use in the study of human aggression for more than 15 years. These procedures have led to a much better understanding of many variables influencing aggression. For example, attack (Epstein & Taylor, 1967), anxiety (Dengerink, 1971), and degree of defeat (Shortell, Epstein, & Taylor, 1970). However, this paper will argue and present some suggestive data advancing the hypothesis that, although the reaction time procedures permit a series of aggression trials, it may not be best suited for studying trial by trial, specific response contingencies between a subject and his or her opponent.

The subject, in the Taylor reaction time procedures, is told that he or she is in a reaction time competition with another subject. (Slide 1) The reaction time competition is a masking task used to hide the fact that aggressive behavior is actually being studied. There is, in fact, no real opponent. When the set light on this task board comes on, he or she is to choose a shock for his or her opponent to receive should he or she lose the reaction time competition on that trial. A five switch will deliver a shock that is 100% of what the opponent indicated was definitely unpleasant. A four is 90%, a three is 80%, a two is 70%, and a one is 60% of the voltage that the opponent indicated was definitely unpleasant during the preliminary threshold trials.

When the press light comes on the subject presses the reaction time key and holds it down until the release light comes on. When the release light comes on the subject releases his or her finger from the reaction time key as rapidly as possible.

When the feedback light comes on the subject receives feedback in the form of a light that indicates what shock level (1-5) the opponent set. And on those trials in which the subject's reaction time was slower, the subject also receives a 1-sec shock to the wrist at the intensity set by the opponent.

When Pisano & Taylor (1971) did this at Kent State University, one-third (40/120) of the undergraduates tested set a three, four, or five on the very first trial before they knew what the other subject had set for them. Pisano and Taylor classified these people as high aggressors and tested them further to see what strategies an opponent could use to effectively bring down their high shock settings. The experimenter programmed the opponent to use one of four different strategies over the 25 trials of the experiment. The ten subjects in the passive condition competed with a programmed opponent who set minimal intensity shocks (ones) on all 25 trials. This condition approximates a passivist's strategy. The ten subjects in the matching condition competed with an opponent who employed a matching strategy--"An eye for an eye and a tooth for a tooth' (Harper, 1904, p. 73). The matching opponent set a one on the first trial but on all other trials (2-25) he set the level of shock that the subject had set on the previous trial. The ten subjects in the punitive condition faced highly punitive subjects who continually set the maximum intensity of shock (fives) on all 25 trials. The ten subjects in the punitive-money condition faced a highly punitive opponent, but following the first trial were given incentives for setting low shocks: 5 pennies each time he set a one, 4 pennies each time he set a

two, 3 pennies for a three, 2 pennies for a four, and 1 penny each time he set a 5-intensity shock.

What Pisano & Taylor found was that the punitive strategy actually increased aggressive responding over the first seven trials of testing. (SLIDE 2) Subjects in the punitive-money condition also tended to increase their aggressiveness across trials, but with much variability. The passive strategy appeared to moderately reduce aggression after Trial 1, but these differences were not statistically significant. Only the matching strategy resulted in statistically significant reductions in aggression over trials. Although not shown in this slide, these differences among the strategy conditions were maintained across the 25 trials.

Actually, the matching strategy itself did not produce "spectacular" results. While three of the ten subjects did reduce their shock settings to one, the average shock setting on the seventh trial was 2.4, a reduction of only .9 from the first trial.

The matching strategy was even more disappointing in Dengerink & Bertilson (1974). Instead of selecting highly aggressive subjects, Dengerink & Bertilson made unselected subjects aggressive by attacking them for the six trials of Block 1. (SLIDE 3) The opponent set fives on every trial in Block 1. Those subjects who were instigated to set at least one five during these six trials were retained for further testing. With these attack-instigated subjects, the passive strategy was the most effective strategy in encouraging subjects to reduce their aggressiveness. Subjects in the matching condition reduced their shock settings very slowly to about 3.8 in Block 4. These shock settings were not significantly lower

than shock settings made by subjects in a yoked control group. (In the yoked condition, each subject received shock and was given feedback about the opponent's settings which were identical to those delivered to a subject in the matching condition. In the yoked condition, however, these settings were not contingent upon those set by the subjects in that condition.)

Dengerink & Bertilson (1974) interpreted the failure of the matching strategy to effectively reduce the subject's aggression as suggesting that the subjects may not have been aware that the opponent's shock settings were contingent upon their own. Several characteristics of the competitive reaction time task (Taylor, 1965) may have contributed to such a lack of awareness of the contingency. (SLIDE 4)

The thesis of this paper is that the opponent's contingent response to the subject's specific shock setting may be obscured by the reaction time competition, thus concealing the matching contingency. When using the matching strategy with the Taylor (1965) reaction time procedures, the following events occur: (1) the subject and opponent simultaneously set a shock intensity for each other, (2) the subject holds his finger on the reaction time key, (3) the subject releases his finger from the key as rapidly as possible, (4) the subject receives feedback in the form of a light indicating what shock level his opponent set for him, and on half of the trials a shock to the wrist at the intensity set by the experimenter, (5) the subject sets a shock intensity, and the experimenter matches the shock intensity that the subject had set during step 1, (6) the subject holds his finger on the reaction time key, (7) the subject releases his finger from the key as rapidly as possible, (8) the subject receives feedback, and (9) the subject sets a shock intensity for his opponent.

During step 4 the subject receives feedback from the trial preceding step 1. Not until step 8 does the subject learn how his opponent responded to what the subject set in step 1. It seems unlikely to me that the subject in step 9 is responding specifically to the matching contingency of step 4, particularly when these four steps of each trial are typically repeated over and over again for 25 trials--thus taxing the subject's memory. This hypothesis is one that we are now testing at Weber State.

Another task (SLIDE 5) is available for testing the effectiveness of the matching strategy. This task is an adaptation of the Hokanson, Willers, & Korospak (1968) interpersonal communication paradigm. In the interpersonal communication task, subjects take turns with their opponents, setting shocks and reward lights (Sidowski, Wyckoff, & Tabory, 1956; Knott, Lasater, & Shuman, 1974) or no-shock lights (Dengerink, Schnedler, & Covey, 1978). In the adaptation of this task in the present research, subjects simply take turns with their opponent, setting different levels of shocks. (SLIDE 6) The purpose of the present experiment is to begin an evaluation and comparison of these two techniques of studying human aggression. As Baron (1977) suggests, it is crucial to the systematic study of human aggression to have an understanding of the techniques employed. A second experiment is presently under way and a third experiment is planned for next fall.

The theoretical basis for this study was derived from Rotter's (1972) suggestion that the probability of any behavior is a joint function of the person's expectations of rewards and punishments from engaging in that behavior and the value of these consequences for the person. "Thus, Rotter would predict that persons who have a high expectation that their aggressive behavior will result in retaliation would be less aggressive than persons

who do not expect retaliation" (Dengerink, 1976, p. 87). It follows then that several trials of an aggressive interchange in which the opponent invariably matches the subject's shock setting should increase the subject's expectation that his or her aggressive behavior will result in retaliation. It was therefore expected that because subjects were likely to recognize the matching contingency more rapidly in the interpersonal communication task, subjects would reduce their shock settings more rapidly during the interpersonal communication task than during the reaction time task.

METHOD

Subjects. The subjects were ten female college students enrolled in introductory psychology at Concordia College. They signed up to participate for course credit in a study that was described as using mild electric shocks. Before recruitment of subjects, sample shocks were demonstrated in their Psychology 101 class at intensities used in this experiment. The findings from this study should be considered suggestive because the small subject pool resulted in testing only ten subjects, and females instead of the males, that were used in both Pisano & Taylor and Dengerink & Bertilson.

Procedures. A series of 25, 20-second trials occurred. On three of the six trials of each block, the subject actually received a 1-second shock from her opponent. The opponent set maximum shocks (fives) for all subjects for the first six trials. Because the current study was concerned with a reduction in aggression, a minimum level of aggressiveness was required. Only those subjects who responded to maximum shocks with a five or higher on at least one trial during Block 1 were retained. During

the subsequent eighteen trials, the opponent followed the matching strategy--the opponent set the intensity that had been chosen by the subject on the immediately preceding trial.

Half the subjects were tested in the interpersonal communication task and the other half of the subjects were tested in the reaction time task. In the interpersonal communication task, the subject was signaled to set the first shock and 10 seconds later the opponent was asked to set a shock. One trial also took 20 seconds to complete in the reaction time task. The duration of each event within a trial (set, press, release, and feedback) was 5 seconds.

Following the 25 trials, the subjects answered a multiple-choice questionnaire designed to assess their suspicion. Data from subjects who indicated that they were suspicious and as a result of their suspicion set higher, lower, or more random shocks were to be deleted from further analyses. Data from subjects who were suspicious but claimed they did not change their shock settings were retained.

RESULTS AND DISCUSSION

Five subjects were tested in the interpersonal communication condition and five in the reaction time condition. Data from 21 other subjects were not used because they failed to set at least one shock as high as a five during the attack phase. Four of these subjects were in the interpersonal communication condition and seventeen in the reaction time condition. Perhaps the 17 subjects in the reaction time condition who did not set a 5 were less likely to perceive the opponents' shock settings as a direct

attack--somewhat obscured by the reaction time competition. This interpretation is consistent with the principal hypothesis of this study.

It might be argued that, regardless of the outcome of this study, the reaction time task is necessary to prevent subjects from guessing the true purpose of the experiment. This argument was not supported. No subjects were dropped from this study because of suspicion.

Data were analyzed via analyses of variance and Tukey A paired comparisons. Several manipulation checks were performed. First, subjects tested with the interpersonal communication and reaction time tasks did not differ in the maximum milliamps of shock they accepted during threshold determination [$F(1,8) = 1.18$, $EMS = 4.15$, $p = .31$]. Second, subjects tested with the two sets of procedures did not differ in their mean shock settings during Trial 1 before experiencing any response from their opponents [$F(1,8) = .00$, $EMS = .55$, $p = 1.00$]. Finally, mean shock settings during the attack phase (trials 2-7) were analyzed separately from the matching strategy phase. The attack by the opponent did not lead to different mean shock settings in the two task conditions [$F(1,8) = 4.17$, $EMS = .542$, $p = .075$]. Thus there was no evidence that the two task groups differed systematically in any way before application of the experimental procedures.

The predicted differences in reduced shock settings between subjects tested with interpersonal communication and reaction time tasks were evaluated by an analysis of variance for the last trial of the attack phase (Trial 7) and the first three trials (Trials 8, 9, and 10) of the matching phase. (SLIDE 7) The main effect comparison of the interpersonal communication

versus reaction time task was not significant [$F(1,8) = .23$, EMS = 3.84, $p = .64$]. As expected, the trial's main effect was significant [$F(3,24) = 8.00$, EMS = .488, $p = .0007$]. Tukey A comparisons indicated that mean shock settings were significantly lower by Trial 9 (3.0) compared to Trial 7 (4.1) and Trial 8 (3.6), $p < .05$. Mean shock settings were also significantly lower in Trial 10 (2.7) compared to Trial 7, $p < .05$.

As predicted, the Trial X Task interaction was significant [$F(3,24) = 4.17$, EMS = .4825, $p = .0164$]. Tukey A comparisons supported the prediction that the opponent's matching strategy led to reduced shock settings more rapidly with the interpersonal communication task than with the reaction time task. With the interpersonal communication task, mean shock settings in Trial 8 (3.2), Trial 9 (2.8), and Trial 10 (2.2) were all significantly less than mean shock settings in Trial 7 (4.6), $p < .01$. With the reaction time task, a significant reduction in shock settings did not occur until Trial 9, and at that, only one comparison was significant. Trial 9 (3.2) shock settings were significantly lower than Trial 8 (4.0), $p < .05$.

These results support the hypothesis of this study that the matching strategy leads to a more rapid reduction of aggression when subjects directly exchange aggressive acts than when the aggressive interaction is masked by a reaction time task. These results also support Dengerink & Bertilson's (1974) suggestion that the matching strategy was ineffective in their study because the matching contingency was masked by the reaction time competition. Finally, these results support the use of Rotter's (1972) theoretical model in predicting attack-instigated aggression. The experimental task that would be expected to most clearly establish an expectancy of retaliation did lead

to the most rapid reduction in aggression.

This paper has argued and presented some suggestive data advancing the hypothesis that the reaction time procedures may not be best suited for studying trial by trial response contingencies between a subject and his or her opponent. However, the present study has tested this hypothesis by making a comparison between two completely different procedures. The differences between those two procedures that we have reported could be due to numerous factors (different instructions, different anger levels, subject hypotheses, etc.). As such, the study that is presently under way is varying intra-task events within the reaction time procedures as another method to evaluate the subjects' ability to perceive trial to trial specific response contingencies between a subject and his or her opponent.

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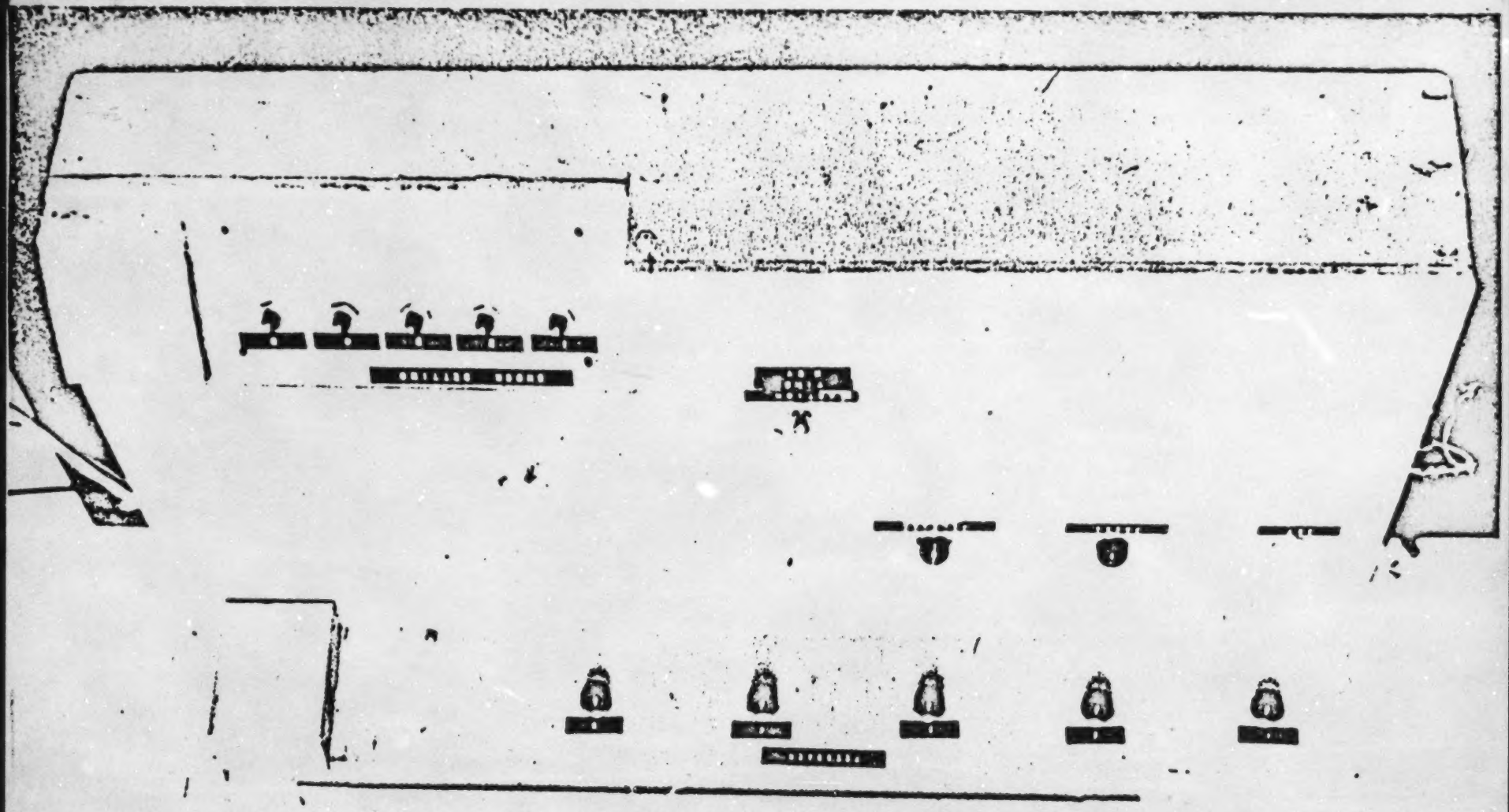

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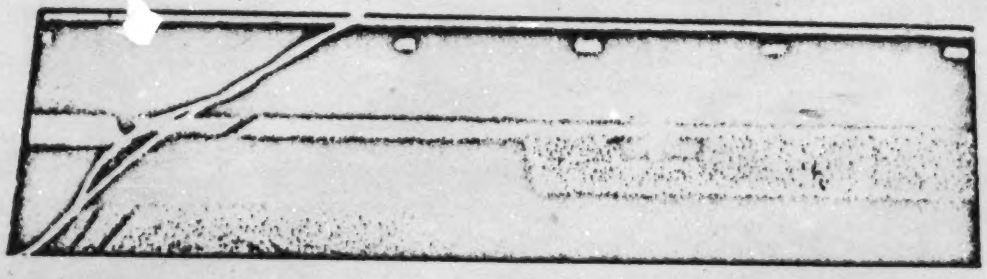

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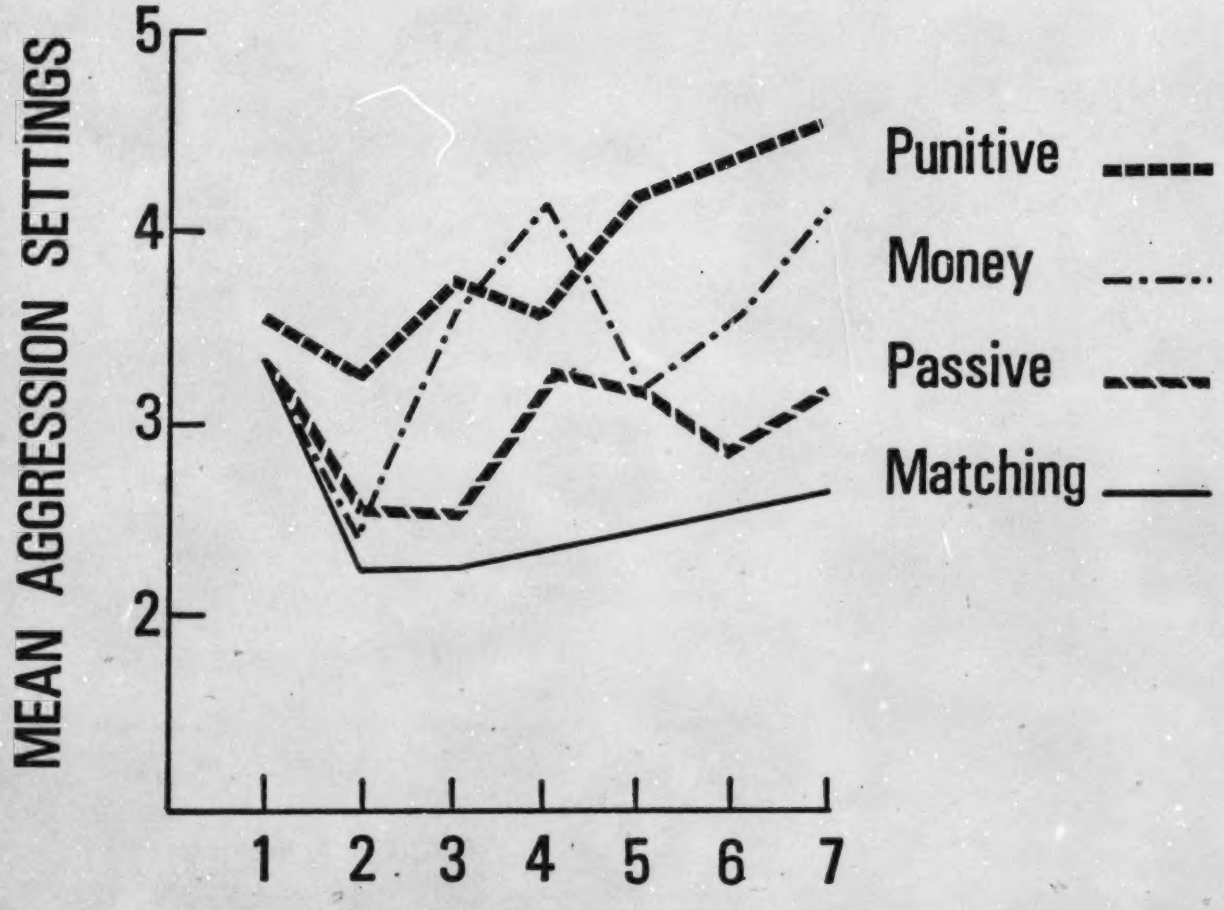
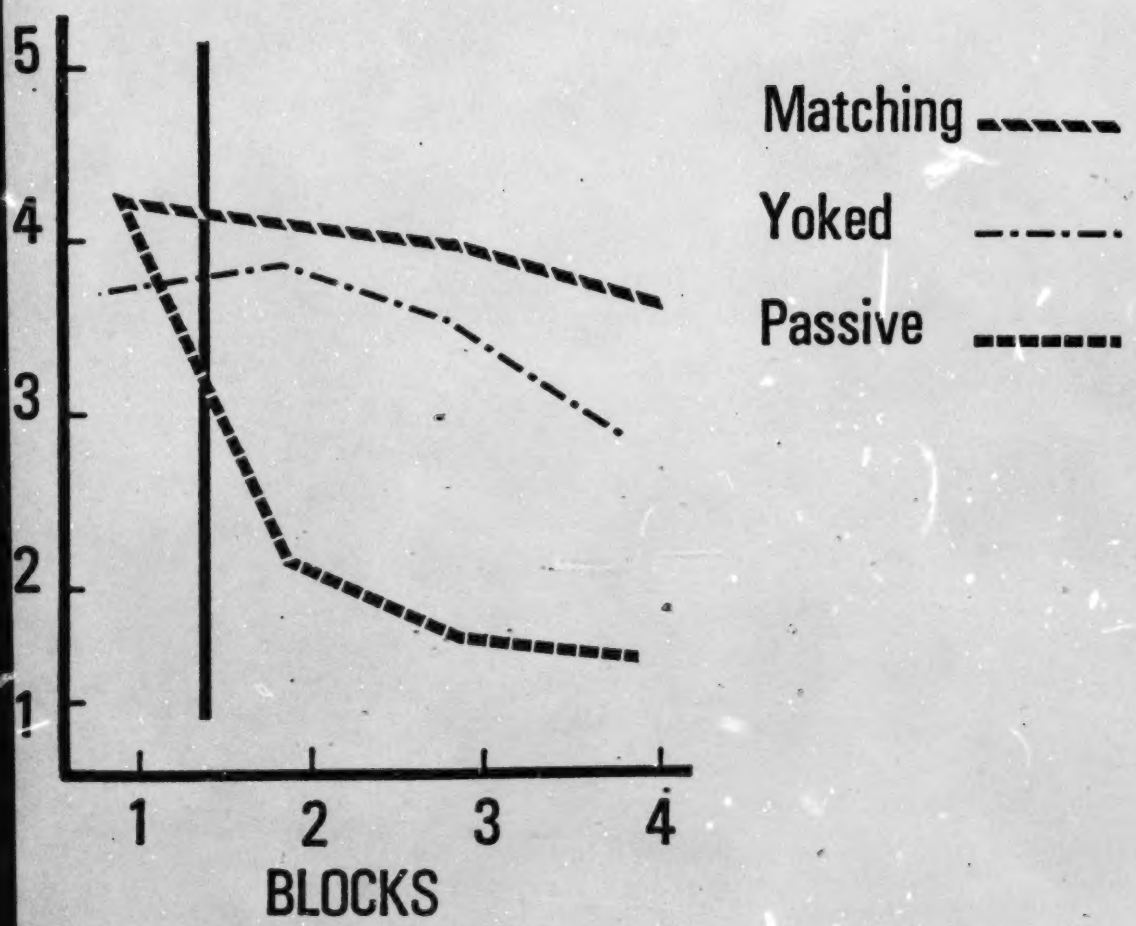
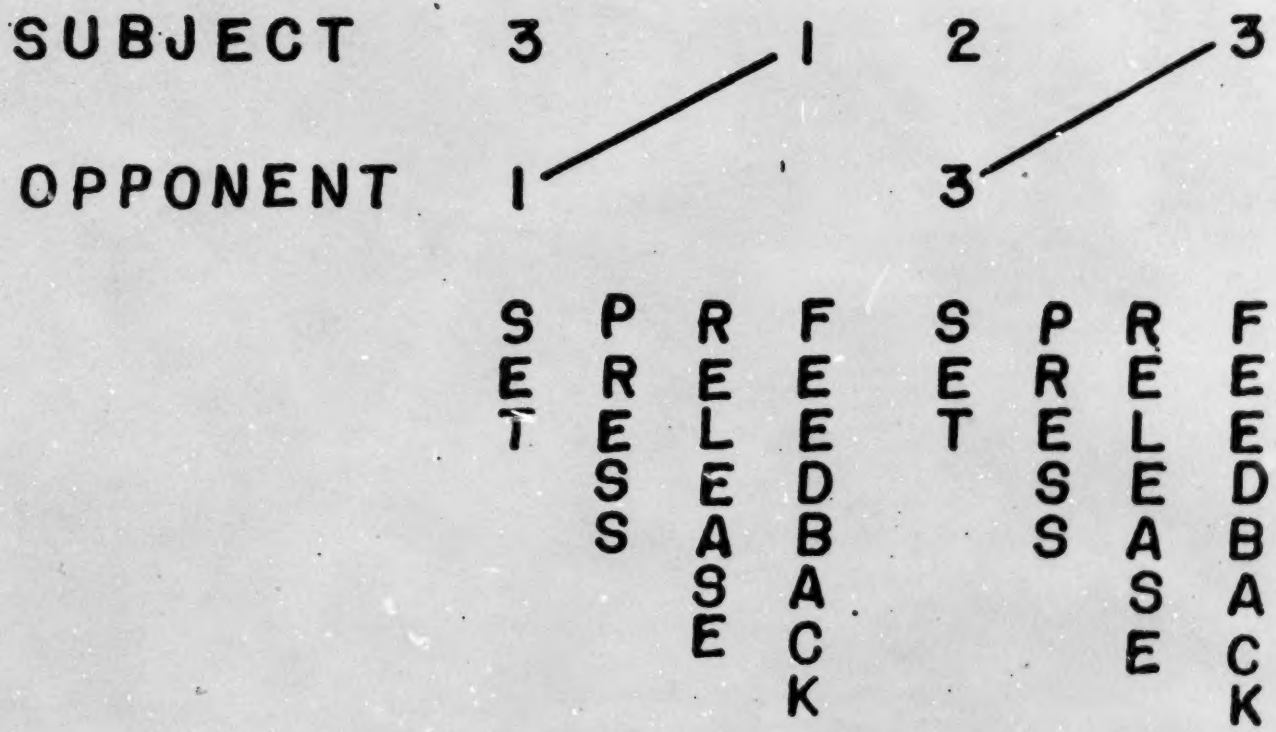


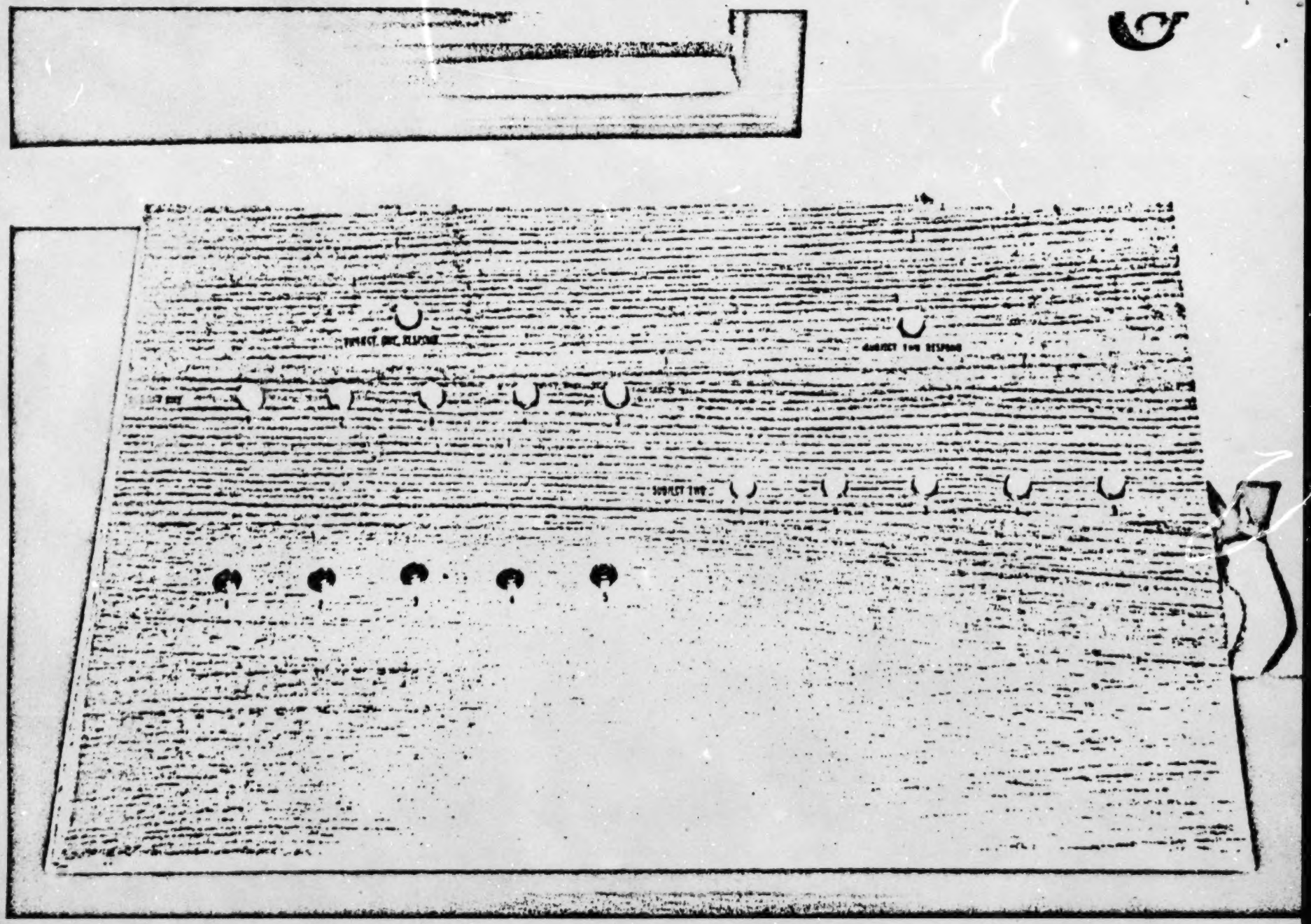
PISANO & TAYLOR (1971)



DENGERINK & BERTILSON (1974)

TAYLOR (1965) PROCEDURES

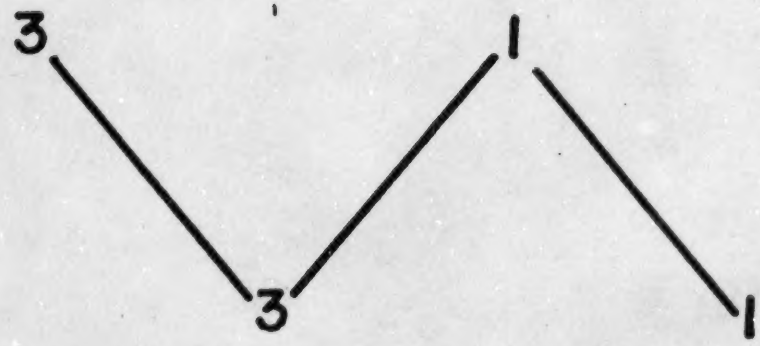


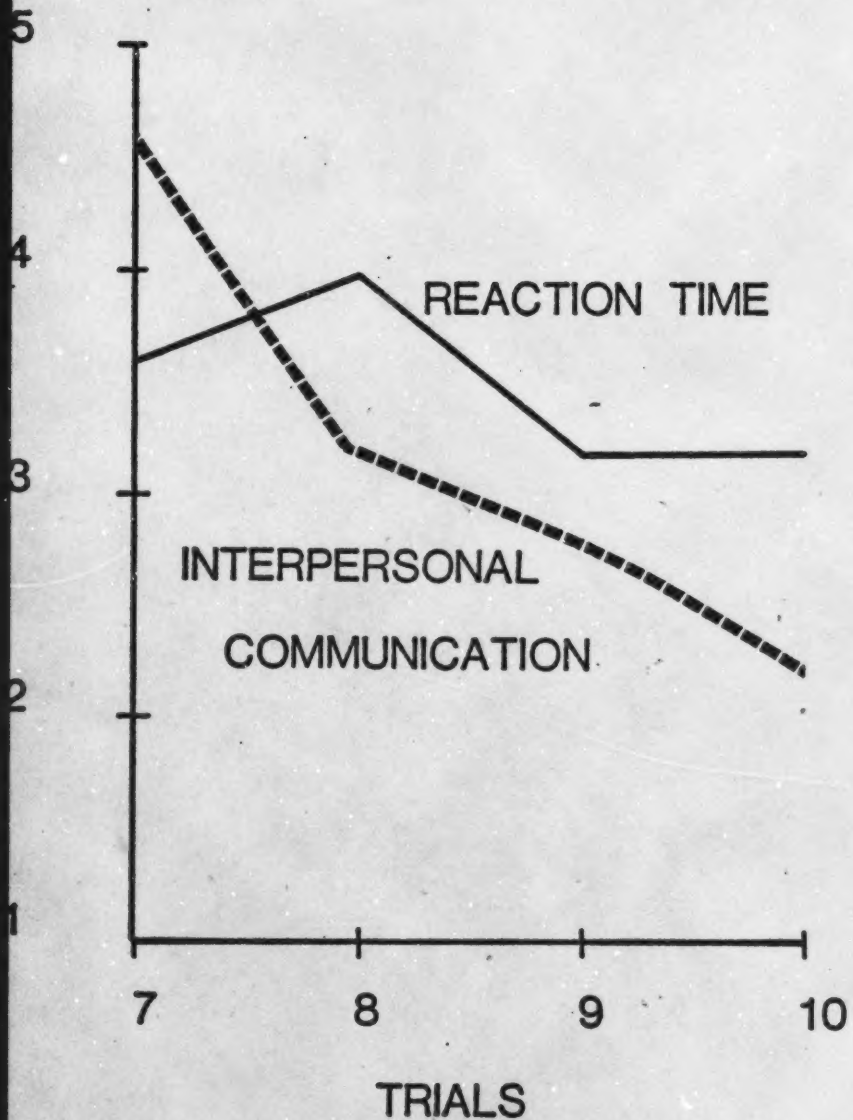


HOKANSON ET AL (1968)

SUBJECT

OPPONENT

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REACTION TIME
INTERPERSONAL
COMMUNICATION
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TRIALS